

### **REMARKS**

Claims 1-20 are pending in the present application. The Office Action has been considered. Favorable reconsideration is respectfully requested.

Claims 1-20 were rejected under 35 U.S.C. §101 as allegedly being directed to non-statutory subject matter. This rejection is respectfully traversed for the following reasons.

Under *In re Bilski*, 545 F.3d 943, 88 USPQ2d 1385 (Fed. Cir. 2008), a claimed method is statutory if the claimed method is tied to a particular machine or apparatus, or transforms a particular article to a different state or thing. Applicant respectfully submits that claim 1, and all of the claims dependent therefrom are tied to a particular machine or apparatus.

Claim 1 recites a method for estimating the time-dispersion of a channel in a communications system, the channel comprising  $D$  subchannels, comprising computing, from a signal received over the channel in a receiver, a set of estimated Channel Transfer Factors (CTF's)  $\hat{H}[v]$ , where  $v$  ( $0 \leq v < D$ ) is the subchannel number, calculating, for a predetermined strictly positive integer  $d$ , a correlation factor  $C_d$  representing the correlations, both in amplitude and in phase, between pairs  $\hat{H}[v]$  and  $\hat{H}[v+d]$  of the computed CTF estimates, and estimating, in the receiver, the time-dispersion of the channel using the calculated correlation factor  $C_d$ .

Claim 1 therefore relates to a channel in a communications system. A channel is

1. [t]ypically what you rent from the telephone company. A voice-grade transmission facility with defined frequency response, gain and bandwidth. Also, a path of communication, either electrical or electromagnetic, between two or more points. Also called a circuit, facility, line, link or path.

Newton's Telecom Dictionary, 24<sup>th</sup> Ed., p. 223 (2008). Exhibit A. While this edition of Newton's is rather new, the definition of channel has not changed over the years; Webster's New World Dictionary of Computer Terms, 3d Ed., p. 27 (1988) defines channel as "(1) A path for electrical or electronic transmission between two or more points. Also called a path, link, line, facility, or circuit." Exhibit B.

Claim 1 also recites that the signal is received over the channel *in a receiver*, and the estimating step is performed *in a receiver*. Thus, the mathematical steps of claim 1 are tied to a particular machine or apparatus, i.e., a receiver and a channel comprising subchannels in a communications system.

Even using the analysis set forth in the action, the claimed invention does "produce a beneficial result" – it provides an estimation of the time-dispersion of the channel. The specification discusses a few ways in which this estimation is useful: it allows channel estimation filtering (pages 4-5) and exploiting the channel correlations in the frequency domain for link-adaptation purposes (page 5, first two paragraphs). In these ways, the determination of the channel time-dispersion estimation is useful.

Furthermore, claims 4 and 5 specifically recite steps which use the calculated correlation factor  $C_d$ . This use is described, e.g., page 9, lines 10-17 of the present application. Thus, even under the Examiner's analysis, claims 4 and 5 are independently patentable under 35 U.S.C. § 101.

Claim 6 recites a device (100) for estimating the time-dispersion of a channel in a communications system, the channel comprising  $D$  subchannels, the device comprising a receiver configured to compute, from a signal received over the channel, a set of estimated Channel Transfer Factors (CTF's)  $\hat{H}[v]$ , where  $v$  ( $0 \leq v < D$ ) is the subchannel number, a correlation unit configured to compute, for a predetermined strictly positive integer  $d$ , a correlation factor  $C_d$  representing the correlations, both in amplitude and in phase, between pairs  $\hat{H}[v]$  and  $\hat{H}[v+d]$  of said computed CTF estimates, and a unit configured to estimate the time dispersion of said channel using the calculated correlation factor  $C_d$ . The rejection of claim 6, and those claims dependent therefrom, are particularly puzzling under the *Bilski* standard. Claim 6 recites multiple apparatuses – a device, a channel, a receiver, a correlation unit, and a unit configured to estimate the time dispersion. This claim is most certainly tied to a machine or apparatus.

Likewise, for the reasons discussed above with respect to claim 1, even under the Examiner's reasoning, claim 6 passes muster under 35 U.S.C. § 101. Further, claim 7 recites a parallel-to-serial unit, which is another apparatus. Claims 10, 19 and 11, 20 recite a look-up table and a link adapter, respectively, which use the calculated correlation factor  $C_d$ . Thus, like claims 4 and 5, claims 10, 19 and 11, 20 are patentable under § 101.

Claim 12 recites a modulated-signal reception apparatus, and claim 13, a telecommunications network, both dependent from claim 6 (directly and indirectly,

respectively). These claims also recite additional apparatus to which the invention is tied.

Claims 14-16 recite a data storage device and a computer program stored on a non-transitory computer readable storage medium, and depend, directly or indirectly, from claim 1. Applicant respectfully submits that these claims recite a particular computer machine because it is programmed to perform particular functions pursuant to instructions from program software. Thus, these claims pass muster under *Bilski*, as well.

Claims 2-3 are believed to be patentable for the reasons discussed above with respect to claim 1 from which they indirectly depend. Claims 17-18 are believed to be patentable for the reasons discussed above with respect to claim 6 from which they indirectly depend.

For at least these reasons, Applicant respectfully submits that the rejection under 35 U.S.C. § 101 should be withdrawn.

In view of the above amendment and remarks, Applicant respectfully requests reconsideration and withdrawal of the outstanding rejections of record. Applicant submits that the application is in condition for allowance and early notice to this effect is most earnestly solicited.

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If the Examiner has any questions, he is invited to contact the undersigned  
at 202-628-5197.

Respectfully submitted,

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